REMARKS

Claims 54-92 remain pending in this application. Applicant respectfully requests reconsideration of the pending claims in view of the following remarks.

Claims 54-60, 62-68, 70-76, 78-84 and 86-92 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,640,278 to Nolan et al. ("Nolan"). This rejection is traversed.

It is known to assign a logical volume to a host to accommodate presentation of the volume to the host without requiring the host to know the particulars of corresponding physical disk drive. It is also known to provide access to such storage through a Storage Area Network (SAN), in conjunction with storage systems and servers that are connected via Fiber Channel equipment or the like to increase bandwidth and connectivity.

Although the SAN has accommodated improved storage access, there are remaining storage management problems. One difficulty involves the management of storage requirements for different entities in an enterprise (*e.g.*, individual users, groups of users, applications, etc.). Satisfaction of the various different demands typically involves configuration according to the requirements of the different entities. For example, one entity may require high capacity, availability and guaranteed bandwidth, and a second may have completely different storage requirements. Access to storage is configured accordingly.

The SAN allows an enterprise to have an accessible pool of storage resources, but management of the SAN still involves management of the different storage requirements.

Applicant's claimed invention accommodates improved management of storage resources in the SAN environment by providing distinct storage domains that have separately configurable storage management properties. An administrator may define different storage domains that

correspond to, yet are separate from, the pool of available storage resources. Another advantage offered with Applicant's claimed invention is that logical volumes are allocated to hosts in the context of individual ones of the so-configured storage domains. As such, the allocation of a logical volume is automatically subject to the configurable storage management properties of the particular storage domain in whose context the allocation is made.

Allocation of logical volumes for one entity may be in the context of a first storage domain, whereas allocation of logical volumes for a second entity may be in the context of a second storage domain. Each of those storage domains has associated storage management properties that are configured as desired. Thus, even if the same volume is allocated to the two entities, the context of allocation – the storage domain – provides the ability to configure and manage the properties of such storage.

Additionally, as set forth in many dependent claims as noted below, the allocation of logical volumes may automatically include various guarantees (storage capacity, bandwidth, availability) for the relevant entity, by virtue of providing such allocation in the context of the storage domain having the noted guarantees among the associated storage management properties.

Applicant submits that claims 54-60, 62-68, 70-76, 78-84 and 86-92 recite features that are neither disclosed nor suggested in any way by Nolan. Independent claim 54 recites *[a] method for managing a storage area network (SAN), the method comprising:*

> *defining storage domains respectively having associated configurable storage management properties that are separate from individual physical capabilities of physical storage resources available through the SAN, wherein a first set of storage management properties is associated with a first storage domain and a second set of storage management properties is associated with a second*

storage domain, with the first set of storage management properties being different from the second set of storage management properties;

accommodating the creation of logical volumes configurable for presentation to hosts through the SAN; and

allocating the logical volumes to hosts in the context of the storage domains, wherein allocating a first logical volume to a first host in the context of the first storage domain entails the provision of storage resources according to the first set of storage management properties and allocating a second volume to a second host in the context of the second storage domain entails the provision of storage resources according to the second set of storage management properties.

Nolan discloses the configuration and management of storage resources available in a SAN. This is accommodated by providing a centralized management capability that layers on top of the existing SAN hardware infrastructures "to provide high-performance, high availability and advanced storage management functionality for heterogeneous environments." (Nolan, at 2:3-9). Nolan refers to this as "storage domain management" and uses the "storage domain" terminology throughout. However, Nolan's storage domain management merely connects the physical capabilities of the SAN with clients in a centralized fashion, and uses interfaces to attempt to ease such management.

The "storage domain" of Nolan clearly differs from the storage domain and the corresponding features claimed by Applicant. Particularly, Nolan offers no disclosure or suggestion regarding the allocation of logical volumes to hosts in the context of a particular storage domain from a plurality of such storage domains, so as to provide such allocation according to the storage management properties associated with that particular storage domain. At most, Nolan describes a single physical storage system with one or more target endpoints to which are connected one or more initiators. Any description of endpoint pairs serves solely to associate an initiator to a target for the purpose of accessing storage that is defined by the target.

There is no discussion of applying management controls to these endpoint pairs over and above those functions that apply to accessing the physical storage associated with the endpoint pair. By contrast, Applicant provides a logical grouping of resources, with a separate allocation of logical volumes to hosts as claimed. Pairs of endpoints may be grouped together such that they can be managed as a single entity. This logical group of endpoint pairs can be made up of one or more physical initiators that span one or more computer systems connected to one or more targets that also span one or more storage systems.

Applicant submits that the Examiner has seized upon Nolan's usage of the term storage domains, coupled with references to common SAN and storage management terms throughout Nolan, in support of the position that Nolan discloses the features of Applicant's claimed invention.

Applicant respectfully submits that the Examiner's analysis is flawed and requests reconsideration. As set forth below, various features of Applicant's claimed invention are clearly absent from Nolan.

The first element of claim 54 recites *defining storage domains ...having ...configurable storage management properties that are separate from individual physical capabilities of physical storage resources available through the SAN, wherein a first set of storage management properties is associated with a first storage domain and a second set of storage management properties is associated with a second storage domain, with the first set of storage management properties being different from the second set of storage management properties.*

These claimed features are absent from Nolan. At best, Nolan discloses that a storage domain provides a central management site for the SAN physical resources, and that the storage domain is configurable in some fashion. Nolan is devoid of any discussion of separate -- first

and second -- storage domains. Further, Nolan clearly does not disclose configuration of two distinct storage domains, with one having a first set of associated storage management properties and the other having a second set of properties that are different from the first set.

Applicant respectfully requests the Examiner to clearly point out and explain how Nolan can be construed to have such a disclosure. The cites offered by the Examiner in the Action clearly do not support such an interpretation of Nolan. Specifically, one passage merely states that storage domains may be used to manage storage resources in a storage network. (Nolan, at 2:19-21) Another refers to the ability to define secure zones, and to define inclusion within a zone at LUN or port levels. (Nolan, at 34:50-64). Zones are well known as is LUN mapping to physical resources. It is not seen how these passages can in any way support a conclusion that Nolan discloses configuration of multiple distinct storage domains respectively having associated, different storage management properties as claimed.

Moreover, even if this element is misconstrued as being present in Nolan, there is clearly no disclosure of the allocation of logical volumes in the fashion claimed by Applicant. That element recites *allocating the logical volumes to hosts in the context of the storage domains, wherein allocating a first logical volume to a first host in the context of the first storage domain entails the provision of storage resources according to the first set of storage management properties and allocating a second volume to a second host in the context of the second storage domain entails the provision of storage resources according to the second set of storage management properties.*

Nolan is deficient in failing to describe even the foundation for this element, in that there is no disclosure in Nolan of the definition of first and second storage domains each having different storage management properties as claimed. Nolan also fails to disclose ***allocating a***

first logical volume to a first host ***in the context of the first storage domain*** and ***allocating a second logical volume*** to a second host ***in the context of the second storage domain*** as claimed by Applicant.

With regard to this element, the citations to Nolan offered in the Action merely appear to re-iterate the distinctions from Applicant's claimed invention as described above, or indicate some other useful feature that is not relevant to the features of Applicant's claims. For example, these citations indicate that the storage transactions are managed in an intermediate device, which provides a management site that accommodates flexibility; that the provision of such a single coordination point allows easy configuration; and that reconfiguration of the storage domain is flexible when new hardware is added. There is no mention whatsoever, nor is there any hint or suggestion in Nolan of the allocation of a first logical volume in the context of a first storage domain, and allocation of a second logical volume in the context of a second storage domain, to respectively provide such storage allocation according to the different storage management properties as defined by the distinct storage domains. At best, Nolan uses the term allocation (although an allocation of physical storage, rather than allocating a logical volume appears to be disclosed in usage of the term (see, *e.g.*, cited passage 5:15-29 of Nolan)). Applicant does not dispute that allocation generally exists. But allocation of logical volumes in the context of two distinct storage domains as claimed is in no way disclosed by Nolan.

Since numerous features recited in Applicant's claim 54 are neither disclosed nor suggested by Nolan, Applicant submits that the rejection of the claim as being anticipated by Nolan is without merit, and respectfully requests reconsideration and withdrawal of that rejection.

For reasons similar to those provided regarding claim 54, independent claims 62, 70 and 78 are also neither disclosed or suggested by Nolan, and Applicant requests reconsideration and withdrawal of the rejection of those claims.

Claims 59-60, 63-68, 71-76, 79-84 and 86-92 depend from these independent claims and thus are distinct from Nolan for the reasons cited above. The additional features found within the independent claims are also absent from Nolan, particularly in the claimed context.

A notable example is claims 57-60, 65-68, 73-76 and 81-84. In fact, the rejection of these claims further illustrates the erroneous interpretation of the Nolan disclosure. As noted above, with Applicant's claimed invention the allocation of logical volumes may automatically include various guarantees (storage capacity, bandwidth, availability) for the relevant entity, by virtue of providing such allocation in the context of the storage domain having the noted guarantees among the storage management properties. The mere description in Nolan that providing high capacity, bandwidth, and availability are desirable does not equate to providing a guarantee that a particular entity will enjoy such properties through a given logical volume. Applicant's claimed invention automatically associates the noted guarantees with the allocation of a logical volume, by virtue of having such allocation being made in the context of the particular storage domain having the particular guarantees.

Accordingly, in Nolan there is no disclosure of the allocation of volumes in the context of a storage domain as claimed. With regard to claim 57 et seq., the passages cited by the Examiner merely state that SANs may grow with demand. This is not the same as providing a guaranteed storage capacity with regard to the allocation of a particular volume. With regard to claim 58 et seq., the general reference to provision of high bandwidth is not the same as providing guaranteed I/O bandwidth and/or I/O operations in the context of a logical volume allocation.

With regard to claims 59-60 et seq., guaranteed performance and guaranteed availability in the context of an allocation are not disclosed by Nolan, which again merely references high performance and availability in a general sense.

Other dependent claim features are also absent from Nolan. For example, claims 56, 64, 72 and 80 recite that "the first logical volume and the second logical volume are a common logical volume, with allocation of the common logical volume to the first host subject to the first set of storage management properties and allocation of the common logical volume to the second host subject to the second set of storage management properties." The Examiner points to language in Nolan that allow a physical device to appear as more than one logical device, and language about logical partitions. These are well known storage management characteristics and do not disclose Applicant's claimed features. In the claim, the first and second volumes are the same logical volume, not two logical volumes corresponding to a single physical device. Moreover, there is no disclosure in Nolan of having first and second sets of storage management properties for such a common volume as claimed.

Finally, with regard to claims 86, 88, 90, and 91, there is clearly no disclosure or suggestion of allocation such that first and second classes of service are provided as claimed.

For the foregoing reasons, Applicant requests reconsideration and withdrawal of the rejection of claims 54-60, 62-68, 70-76, 78-84 and 86-92 as being anticipated by Nolan.

Claims 61, 69, 77 and 85 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Nolan in view of Hubis et al. (Hubis). This rejection is traversed.

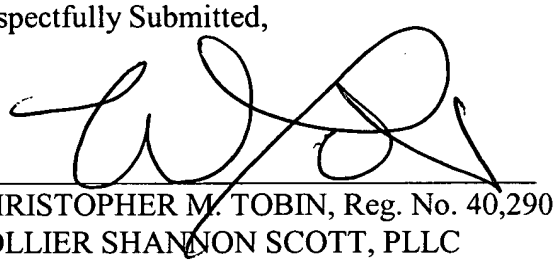
Claims 61, 69, 77 and 85 incorporate the features recited in their respective independent claims. As clearly set forth above, Nolan does not disclose or suggest the features recited in those claims. Nor, for reasons already made of record, does Hubis disclose such features.

Accordingly, Applicant requests reconsideration and withdrawal of the rejection of claims 61, 69, 77 and 85.

In view the foregoing amendments and remarks, Applicant respectfully submits that the claims in this application are in condition for allowance.

Should the Examiner believe that anything further is desirable to place the application in condition for allowance, the Examiner is invited to contact Applicant's undersigned representative at the telephone number listed below.

Respectfully Submitted,



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CHRISTOPHER M. TOBIN, Reg. No. 40,290
COLLIER SHANNON SCOTT, PLLC
3050 K Street, N.W., Suite 400
Washington, D.C. 20007
(202) 342-8508